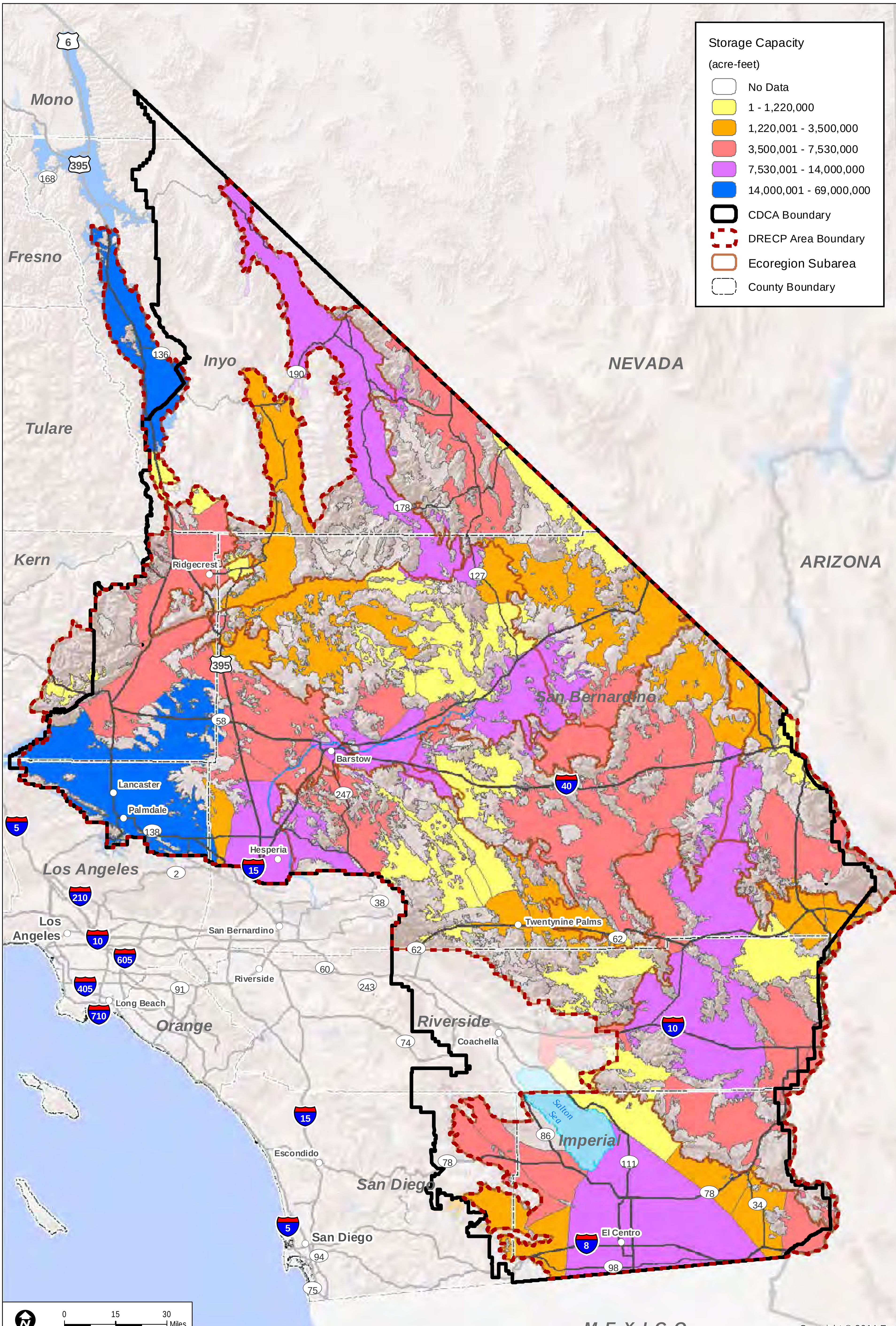

Sources: ESRI (2014); California Department of Water Resources (2003)

FIGURE III.6-3

Distribution of Reported Storage Capacity

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In general, basins with the lowest reported storage capacity values (less than 3,500,000 acre-feet) are south of Death Valley or near the Twentynine Palms area. Groundwater basins with higher reported storage capacity values (up to 14,000,000 acre-feet) occur near the Mojave River, in basins surrounding the Cadiz Valley, in Death Valley, and south of the Salton Sea. Owens Valley and Antelope Valley have the greatest reported storage capacity values (14,000,000 and 69,000,000 acre-feet, respectively). Although these storage capacities appear large, for practical purposes most of the water is likely unavailable due to high pumping costs, poor quality, or low perennial yield.

Reported well yields are a general indicator of a basin's ability to transmit groundwater. The distribution of typical irrigation and municipal supply well yields, as reported in CDWR Bulletin 118, are mapped in Figure III.6-4. In general, average yields vary from 16 gallons per minute (gpm) to 2,500 gpm. Of the basins with reported municipal or irrigation well yields, most yields fall between 200 and 500 gpm. However, 16 basins have relatively low reported municipal/irrigation well yields (less than 100 gpm), and 10 basins have reported yields greater than 1,000 gpm. Middle Amargosa Valley has the highest reported municipal/ irrigation well yields, ranging from 2,500 to 3,000 gpm, which may correspond to extraction from the carbonate aquifer. Lanfair Valley has the lowest recorded municipal/ irrigation well yields, ranging from 3 to 70 gpm and averaging 16 gpm, which may correspond to a thin alluvial or fractured rock aquifer.

III.6.3.2 Groundwater Basin Boundaries

A portion of the DRECP area is in the Basin and Range Geologic Province, where vertical movement along faults creates deep fault-bounded structural troughs filled with alluvial deposits derived principally from erosion of the steep, narrow mountain ranges that separate the basins. The boundaries between valley floor areas (groundwater basins) and adjacent mountain ranges are therefore commonly associated with faults.

Figure III.6-5 shows alluvial basins bordered by faults and additional faults that run through the interior of some basins. The hydraulic influence of these faults is variable. Some faults provide preferential pathways for vertical or horizontal groundwater flow along the fault; other faults act as a barrier and impede groundwater flow, either partially or completely. The San Andreas Fault Zone, Garlock Fault Zone, Elsinore Fault Zone, Granite Mountain Fault Zone, Pinto Mountain Fault Zone, and Death Valley–Furnace Creek Fault Zone may act as barriers or impediments to subsurface flow in many portions of the groundwater basins. Other smaller faults may or may not have similar characteristics with respect to influencing groundwater movement within basins. Hydrologic analyses for renewable energy projects will need to collect sufficient groundwater data to evaluate the influence of faults on groundwater flow into, within, and out of the basins.

Some alluvial groundwater basins are hydrologically connected, and water can move between basins across their boundaries, through or over fault planes, or through alluvium-filled gaps in mountain ranges. These basins are considered "interconnected basins," and their characteristics are discussed in Section III.6.3.3.4, Interconnected Basins and Subsurface Flow.

III.6.3.3 Water Inflows and Outflows

The water balance (or budget) is an accounting of all inflows (recharge) and outflows (discharge) to and from a basin. If relatively long-term inflows exceed outflows, water in storage increases and groundwater levels should rise until groundwater discharge increases to establish a new equilibrium between inflow and outflow. For example, rising water levels can cause groundwater to discharge at the ground surface and become surface-water outflow in the form of perennial streams, springs, or lakes. These surficial discharges either flow out from the basin or are consumed by riparian vegetation (evapotranspiration), beneficial use, or simple evaporation. Shallow groundwater can also evaporate from playas, leave the basin as groundwater underflow, or be transpired by phreatophytic vegetation (phreatophytic vegetation is deep-rooted, and obtains water from a permanent groundwater supply or from the water table). In the opposite case, when groundwater is extracted and consumed, the increased outflow can sometimes exceed inflow; as a result, water in storage can decrease causing groundwater levels to decline and natural discharge to decrease. Declining groundwater levels can decrease the yields of existing wells, decrease discharge to streams, springs, and playas, and reduce the water supply available to phreatophytes. Declining groundwater levels can also cause compaction of previously saturated beds and subsidence of the land surface. Subsidence creates an irreversible reduction in groundwater storage capacity.

The DWR reported basin water balance estimates are approximate at best. Bulletin 118 categorizes almost all basins in the DRECP area as having "Type C" water budgets, which means there is little knowledge of any of the budget's components at the time it was published. This means that detailed data collection and analysis will be required to appropriately quantify the water budget components and assess the possible effects of groundwater consumption by renewable energy projects.[3]

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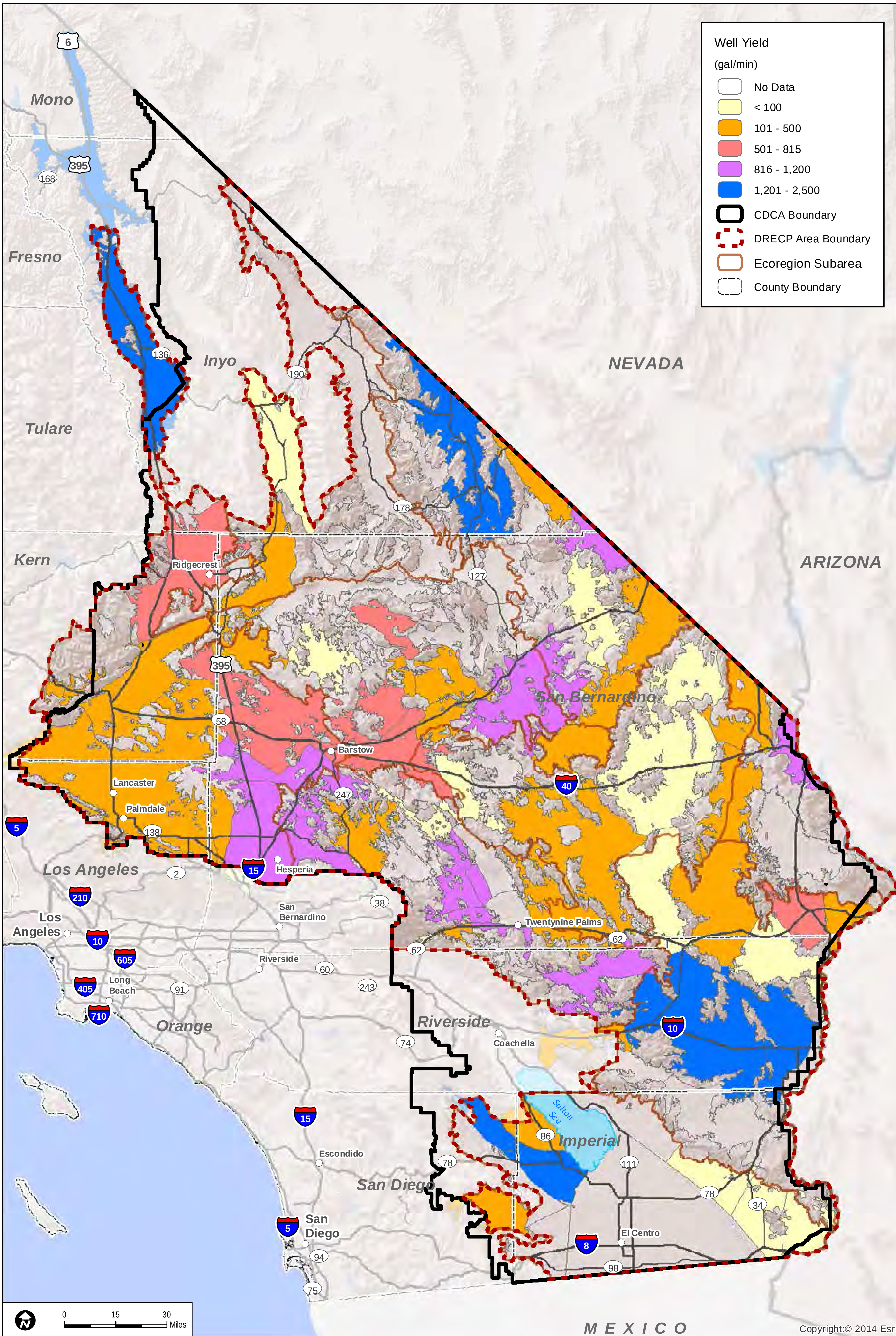
[3] Some water budget components reported as part of existing programs can provide a starting point for detailed water budget assessments. For example, in adjudicated basins the specific information can be obtained from the various court-appointed Watermasters that manage those basins. In other developed basins, some budget information can be obtained from Urban Water Management Plans (UWMP) prepared by the urban water suppliers. UWMPs have been prepared for the Mojave Basin (http://www.mojavewater.org/planning.html) and the Antelope Valley Basin (http://www.ladpw.org/wwd/avirwmp/index.cfm?fuseaction=documents). Additional UWMPs for entities in the Plan Area are available from CDWR (http://www.water.ca.gov/urbanwatermanagement/2010uwmps).



Sources: ESRI (2014); California Department of Water Resources (2003)

FIGURE III.6-4

Distribution of Average Reported Irrigation and Municipal Well Yields

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